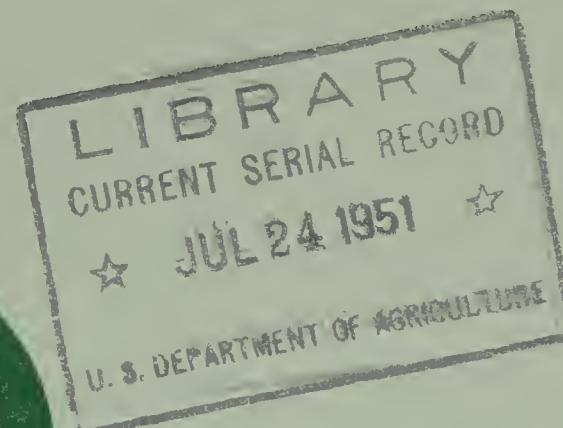


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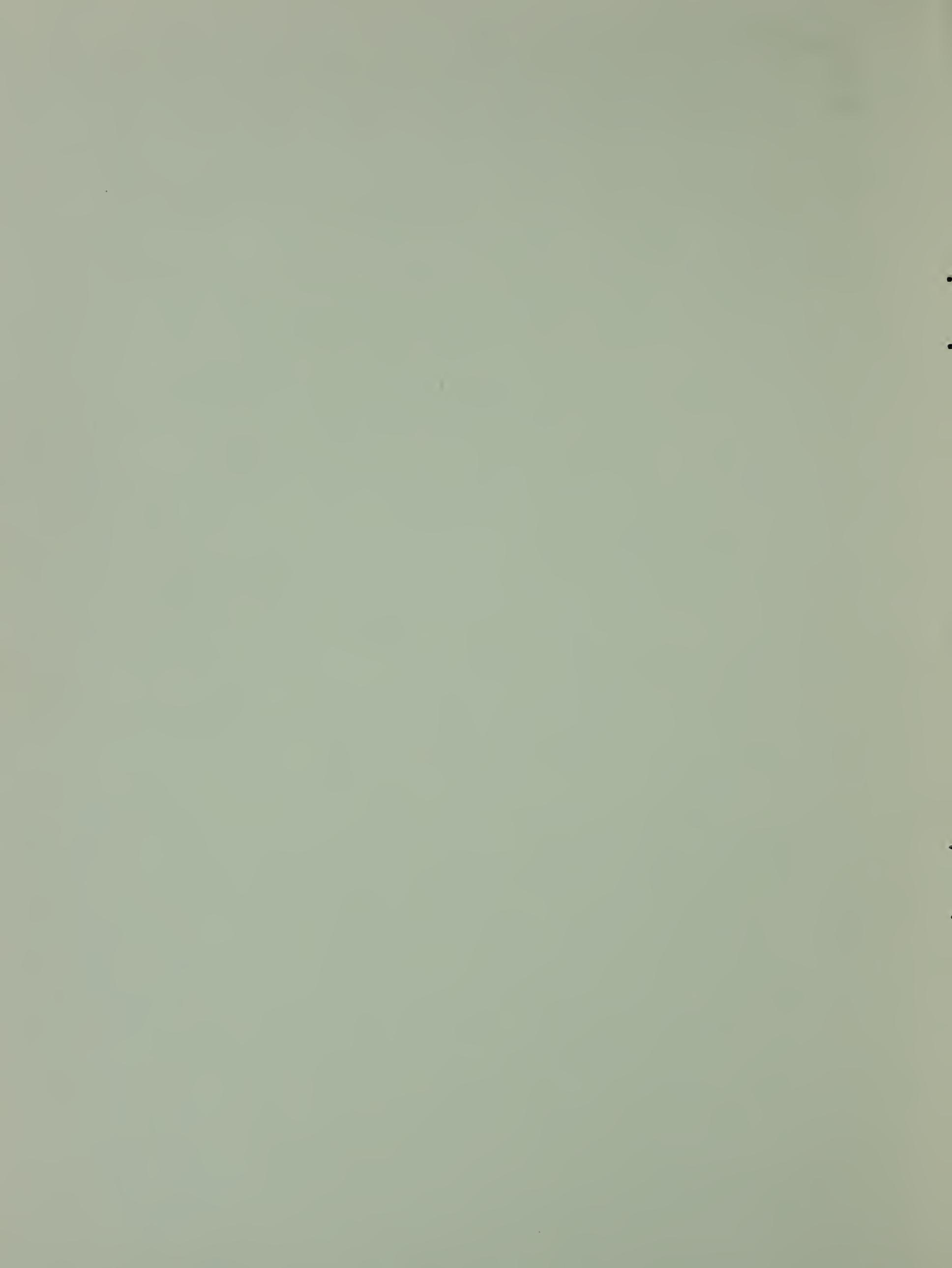
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Years

OF PLANT SCIENCE



B P I S A E RESEARCH ACTIVITIES

PLEASE CIRCULATE TO ALL INTERESTED EMPLOYEES OF THE BUREAU

PLANT INDUSTRY STATION, BELTSVILLE, MD.

JULY 1951

FOR ADMINISTRATIVE USE ONLY

Our Fiftieth Anniversary

The Bureau was established during the last summer of President McKinley's administration. In 1901 nearly 60 percent of the people of the United States lived on farms. In the West there was still land open to homesteaders. But the new frontier lay in the application of scientific research to the problems of agriculture.

This issue of RESEARCH ACTIVITIES sums up briefly some of the problems and some of the contributions of research units in the Bureau over the past 50 years.

Many of you can fill in the outline with memories of the men whose vision, enthusiasm, energy, and patience set the pattern we follow today. They paved the way. They began the formulation of agricultural problems at the regional and national level. They were the first to work out memoranda of understanding for cooperative research with State and Federal agencies and with private industries and to plan the network of laboratories and field stations we now use.

It has been suggested that we set a time later in the year--preferably in the fall when the rush of field work is over--for an appropriate program to celebrate the Bureau's first half century. This might be a seminar. It should look to the future as well as the past. A committee composed of K.S. Quisenberry, chairman, Wallace Ashby, L.E. Childers, C.O. Erlanson, L.M. Hutchins, J.R. Magness, and R.Q. Parks is looking into the matter. They will be glad to have your suggestions on topics and speakers.

Sincerely yours,

Robert M. Salter

Important dates in the organizations now in BPISAE

- 1901 The Bureau of Plant Industry and the Bureau of Soils established.
- 1904 BPI institutes farm cooperative demonstration work in boll weevil infested districts of the Southwest.
- 1906 BPI authorized to investigate and encourage the adoption of improved methods of farm management.
- 1915 Farm management program transferred to the Office of Farm Management.
- 1916 Farm demonstration work transferred to the States Relations Service, which later became the Agricultural Extension Service.
- 1925 Division of Agricultural Engineering placed in the Bureau of Public Roads.
- 1927 Bureau of Soils merged with Bureau of Chemistry.
- 1928 Land acquired for the National Arboretum.
- 1931 Bureau of Agricultural Engineering established.
U.S. Horticultural Field Station set up at Beltsville, Md.
- 1936 Soil fertility and soil microbiology research transferred to BPI.
- 1937 Bankhead-Jones laboratories established for vegetable research at Charleston, S.C., for pasture improvement at State College, Pa., for soybean investigations at Urbana, Ill., for salinity studies at Riverside, Calif., for plant and soil nutrition research at Ithaca, N.Y.
- 1938 Soil survey work transferred from Bureau of Chemistry and Soils to BPI.
Federal Seed Act enforcement moved from BPI to BAE.
- 1939 Bureau of Agricultural Engineering merged with Bureau of Chemistry.
Fertilizer research transferred to BPI.
- 1940 Arlington Experimental Farm transferred to U.S. Dept of War.
- 1942 ARA set up to coordinate work of BPI and other research bureaus in USDA.

1943 Agricultural Engineering transferred to BPI and name of Bureau changed to BPISAE.

Bureau headquarters moved to Beltsville, Former horticultural field station became Plant Industry Station.

As we were--BPI in 1901

"The bringing together of the related lines of work was accomplished with perfect harmony and the advantages of the union soon became apparent," observed Bureau Chief B. T. Galloway in his first annual report to the Secretary of Agriculture.

Dr. Galloway referred to work already in progress in USDA. In the new Bureau this was realigned as vegetable pathological and physiological investigations, botanical investigations and experiments (including cereals, fibers, and tropical crops), grass and forage plant investigations, pomological investigations, the experimental gardens and grounds on the mall around USDA, the Arlington experimental farm, investigations in the production of domestic tea, foreign seed and plant introduction, and Congressional seed distribution.

Among the 42 staff members listed by Dr. Galloway in the report were A. F. Woods, Erwin F. Smith, W. T. Swingle, M. B. Waite, Mark Carleton, W. A. Orton, C. F. Shear, Flora W. Patterson, F. V. Coville, O. F. Cook, C. S. Scofield, W. A. Taylor, H. P. Gould, T. H. Kearney and David Fairchild -- names now associated with long and distinguished service in agricultural research. Of this group Dr. Swingle, Dr. Scofield, Dr. Shear, Dr. Kearney and Dr. Fairchild are living.

Cooperative work in grass and forage investigations was in progress with 13 State Experiment Stations. Other joint projects were being carried on with the research bureaus -- Soils, Forestry, and Chemistry. One of the 12 publications issued in 1901 was on plant breeding. It discussed the selection--for breeding purposes--of wilt-resistant cotton plants in infected areas.

As Dr. Fairchild recalled it in The World Was My Garden, "The old division of plant pathology and physiology, with which I made my debut, now formed the center of a new Bureau with Dr. Galloway still as the chief. The scope of activities had increased tremendously since the days when one bacterial disease of plants was known--pear blight. New diseases caused by bacteria or fungi seemed on every hand and the technique for their detection and diagnosis was being rapidly improved. More efficacious methods for their treatment and prevention were also being devised, although many of the diseases proved baffling.

"The problem of controlling their spread by regulatory methods had appeared on the horizon, and was forcing the pathologists--unwillingly, it should be stated--to join the entomologists in quarantine procedures, which we of the S.P.I. regretted, as we felt they would affect the spirit of the whole organization."

In retrospect we can see that the genetic approach to plant problems has prevailed. The concept had been stated by Dr. Galloway in the USDA Yearbook for 1899 when he predicted, "The pathology of the future will not stop at the mere correction of conditions involving the loss of a crop or a part of a crop. It will put within the power of the intelligent grower, knowledge that will enable him to forestall injuries by furnishing conditions best suited to the development of the plant. Plant breeding will enable us to attain ideal forms. Selections will make it possible to fix these forms within certain limits. Nutrition goes hand in hand with breeding and selection. Chemistry and physics play important parts and in the study of pathological phenomena themselves, other branches of science will be brought to bear."

Chiefs of the Bureau

1901-1913. Beverly T. Galloway, plant pathologist and plant explorer, first chief of BPI. A Missourian, he joined USDA in 1887. Except for two years, one as Assistant Secretary of Agriculture, the other as dean of the College of Agriculture at Cornell, Dr. Galloway remained in the Bureau until his retirement in 1933. He maintained an interest in Bureau research until his death in 1937.

1913-1933. William Alton Taylor, pomologist. Educated in Michigan State, Dr. Taylor came to USDA in 1891. He was placed in charge of field investigations when the Bureau was organized in 1901, was made assistant chief in 1909, served the longest tenure as chief as any one to date. He continued as a collaborator after his retirement in 1933. Dr. Taylor died in 1949 at the age of 86.

1934. Knowles A. Ryerson, horticulturist. A native of Washington State, a graduate of the University of California, Professor Ryerson joined the Bureau in 1927 to direct plant introduction. After a brief tour of duty as chief, he served as leader in research on tropical and subtropical fruits. In 1937 he returned to the University of California where he is professor of horticultural crops and assistant dean of the College of Agriculture.

1934-38. Frederick D. Richey, agronomist. He joined the Bureau in 1911, two years after graduation from the University of Missouri. Placed in charge of corn investigations in 1921, Dr. Richey was a leader in organizing the administration of cooperative research in hybrid corn. Since 1938 he has conducted research in corn breeding with special attention to improved lines for the South. His headquarters are at Knoxville, Tenn.

1938-42. Eugene C. Auchter, horticulturist. A New Yorker educated at Cornell, Dr. Auchter taught and did research at Cornell, the University of West Virginia, and the University of Maryland before joining the Bureau in 1928. He was in charge of horticultural crops and diseases and served as Assistant Chief of the Bureau prior to his appointment as Chief. In 1942 he became ARA Administrator. He left USDA in 1946 to become President and Director of the Pineapple Research Institute.

Since 1942, Robert M. Salter, soil scientist. A native of Indiana, educated at Ohio State University, Dr. Salter began his scientific career in West Virginia. He served first as soils chemist and later as head agronomist at the Experiment Station from 1917 to 1921. During the next 20 years he was on the staff of Ohio State University. He was chairman of the Department of Agronomy in charge of both soils and crops in the University and the Agricultural Experiment Station from 1929 to 1940. He was made associate director of the Station in 1939. Dr. Salter became director of the North Carolina Experiment Station in 1940. He joined the Bureau as head of the division of soil and fertilizer investigations in 1941 and was appointed to his present position the following year.

Milestones in Bureau Research

1901 Investigations begun to find adaptability of important fruits in commercial fruit districts.

1902 Research authorized in soil bacteriology and plant nutrition.

1903. Ladino clover introduced from Italy.

1904 Detection of adulterated field crop seed begun. Tung introduced from China.

1905 Research begun: on dry-land agricultural and horticultural development in the Great Plains States; on crop production under irrigation. Trebi barley introduced from Asiatic Turkey. First report made on a cross involving inbred lines of corn. Fusarium wilt resistance established in upland cotton and the Dillon variety released.

1907 Acala cotton introduced from Mexico. Self-boiled lime sulfur found most satisfactory and least harmful fungicide for control of peach brown rot and apple scab.

1908 Beginning of introductions, which established the date industry in the United States. Yuma, American-Egyptian cotton released in the Southwest. Research begun on the domestication and improvement of the wild blueberry.

1909 Uniform tillage and rotation experiments established in semiarid regions, research begun on pre-cooling fruit before transcontinental shipment. Hegari sorghum introduced from Africa. First bulletin on forest tree diseases published. White pine blister rust discovered.

1910 Ladak alfalfa introduced from India.

1911 First recommendation made for cotton improvement on a community basis. Intensive fertilizer research begun with potash fertilizer resources in the United States. Moisture equivalent device developed to measure water holding capacity and wilting point of soils.

1912 Cooperative rice research established in California leading to the rice industry in that State. Cooperative farm windbreak demonstrations and testing begun in the Great Plains.

1914 Studies begun on the fixation of atmospheric nitrogen for fertilizer. The citrus nematode found to occur in California. Federation wheat introduced from Australia.

1915 Studies initiated: to develop furnace process for the production of phosphoric acid and phosphatic fertilizer; to improve design principles of farm machinery and farm buildings; to make uniform regional wheat variety tests. Concept of soils as a living organism adopted as a basis of soils research. Principles of soil moisture behavior under semi-arid conditions announced--this exploded the popular "capillary rise" and "dust mulch" theories. Cause and method of citrus canker determined.

1916 Research begun: on diseases of corn; on soil colloids.

1917 Plant Disease Survey initiated. Cooperative plan for labeling field crop seeds set up with seed industry.

1918 Research in bud variation of citrus fruits stimulated great improvement through the propagation of valuable sports. Discovered that physiologic races in stem rust attack different varieties of wheat.

1919 Korean lespedeza introduced. Mosaic in sugarcane noted in eastern Louisiana. Oiled paper wraps found to be effective in control of apple scald. First variety of tobacco resistant to black root rot released.

1920 Discovery that length of day controls flowering and seed production in many plants announced. Proof established that: bacterial wilt in cucurbits overwinters in a hibernating insect; aphids transmit sugarcane mosaic. Breeding program to improve lettuce initiated. Systematic study of soil profiles accepted as the basis of soil classification in the United States. Study of soil chemistry in relation to soil classification begun.

1921 Relationship between plant injury and magnesium deficiency in soils established. Deep placement of organic manures found to control root rot in cotton. Practical methods devised for commercial bulb production in the United States. Research inaugurated on sources of crude rubber in the Western hemisphere.

1922 Federal-State research inaugurated to develop inbred lines for hybrid corn.

1923 Economical field over-wintering method devised for production of sugar-beet seed.

1924 Sericea lespedeza introduced.

1925 Abaca introduced from the Philippines for production in Panama. Marglobe tomato released. Research begun: on quality of irrigation waters; on varieties and methods suited for production of fall-sown flax in Southwest.

1926 Regal, first smut-resistant variety of wheat for Northwest, released. Studies inaugurated: to find relation of storage temperature to apple softening; to improve muskmelon varieties.

1927 Victoria oats introduced from Uruguay...Russian wildrye from Siberia.

1928 Released first improved variety of sugarcane resistant to mosaic...first combine type of grain sorghum. Patent issued for improved process in drying seed cotton at gin. Proof established that most soil clays are composed of crystalline materials.

1929 National Potato Breeding Program organized. Aerial photographs first used for soil maps. Value of fans in refrigerator cars demonstrated. Chemical dips developed to prevent sap stain losses in green lumber.

1930 Blakemore strawberry introduced. High degree of crown rust resistance discovered in Bond and Victoria oats. Research begun on fruits and vegetables suitable for freezing. Improvement of red clover varieties begun.

1931 U.S.I, first curly-top resistant sugar beet, and Katahdin potato released. Selenium in plants shown to cause death of range animals. Magnesium deficiency in soil detected through injury to tobacco plant.

1932 Zinc deficiency established as cause of pecan rosette.

1933 Four lines of hybrid corn and Golden Cross Bantam sweet corn released to growers. Breeding of onion lines for hybridizing begun.

1934 Value of shelter belt planting demonstrated at Great Plains field stations. Procedure for rating kinds of soil by productivity and expected crop yields developed. Findings showed need for early removal of excess apples from the trees to stabilize production of the crop. Thatcher, first wheat variety highly resistant to stem rust, distributed in hard red spring area...and first flue-cured tobacco varieties with resistance to black root rot released.

1935 Pangola grass introduced in Florida...Manehar brome from Siberia. Research begun: to control bindweed. Powdery mildew resistant cantaloupe No. 45...U.S. Refugee No. 5 snapbean...and first hybrid popcorn released.

1936 Soil moisture measurement at seeding time established as a guide to wheat yields. Methods devised to prevent heart rot in young sprout oak stands.

1937 First effective treatment devised to control tobacco blue mold.

1938 Research begun: on chemical plant growth regulators: tung production. First amphidiploid cottons paved way to use triple hybrid cottons in breeding. Sugar beet variety US 15, both disease resistant and non-bolting, released, Virus found to cause phloem necrosis in elms.

1939 First standard density press for cotton gins developed. Effectiveness of growth chemicals for preventing fruit drop discovered. Jordanola almond released to growers. Controls developed for canker stain in plane trees.

1940 First variety of waxy grain sorghum...first flue-cured tobaccos with resistance to black shank...Pan-America tomato released. Research begun on role of polyploidy in genetic research. Design principles of flax deseeding made available. Research inaugurated on cooperative Hevea rubber program with 13 Latin American countries.

1941 U.S. 13 hybrid seed corn...Tama and Vicland, smut resistant oats distributed. Golden nematode discovered on potatoes on Long Island, N.Y. Principle devised for using a shell of circulation spaces in walls and floors of potato storage bins.

1942 Defoliation first used to aid mechanical harvesting of cotton. Safe limits of moisture for grains in storage established. Three canning cling peach varieties...Lincoln soybean...Glenn Dale azaleas released to growers. Soil cover found to prevent decay in houses without basements.

1943 Research begun on vitamin content of fruits and vegetables...the use of new nematocidal soil fumigants. Methods developed for reversible air circulation in refrigerated storages. Successful fungicidal control devised for South American leaf blight of Hevea. Improvements in decay inspection criteria increase aircraft plywood supply.

1944 Plant growth regulators used to kill weeds. First hybrid onion...Oxford 26, first wilt resistant tobacco...Dixigem peach released...Research begun on sugarcane production and harvesting machinery. USDA-seed trade cooperative plan inaugurated for the release of seed of improved varieties of vegetables. A farm-size peanut sheller developed for seed peanuts. Bahia grass introduced from Argentina.

1945 Research begun: with radioisotopes from the atomic pile; on toxicity of new insecticides; on pre-development of newly irrigated lands in Columbia and Lower Colorado River Basins; on world soil map, and on relation of moisture-fertility-stand to crop yields. Male-sterility factor discovered in sugar beets. Interspecific cross provided first breeding material for wildfire resistant tobacco varieties.

1946 Demonstrated: use of selective weed killers in cereal crop production; value of slatted floor hay drier in Southeast. Research begun: on soils of Alaska; on cotton production and harvesting machinery. Clinton and Benton oats, superior varieties for the Corn Belt, distributed. Feeding unit developed to deliver dust at constant rate to nozzles in crop dusters.

1947 Internal surface of clays measured. Federal-State program of plant introduction begun. Five corn hybrids resistant to European corn borer...Acala 4-42, superior new cotton for California, released.

1948 Growth regulators shown to prolong blooms on certain ornamental shrubs. Nematodes shown to limit mushroom production. Methods and equipment devised for preparation of radioactive phosphates.

1949 Cooperative project begun to increase foundation seed stocks of improved grasses and legumes. Basic soil surveys initiated for classifying land for irrigation in the Missouri Valley. Salt tolerance established for certain crops during germination. Five improved varieties of tung trees... 3 new varieties of Chinese chestnuts... Congo watermelon released.

1950 Research accelerated to find resistance to wheat rust race 15B. Interspecific hybrid of guayule originated with 40 percent more rubber. Topcrop, superior snap bean, Dixie Bright 101 and 102, tobacco varieties resistant to bacterial wilt and black shank, released. Research begun on soil management for Missouri Basin. Apple grader for orchard use devised. Mesquite and other hardwood sprouts controlled with 2,4,5-T. Citrus quality standards based on Bureau findings adopted in Florida. Method devised to accelerate testing of wood preservatives.

As we are--BPISAE in 1951

At the close of the fiscal year, research was in progress on 925 line projects at 183 locations in 45 States, Puerto Rico, 9 Latin American countries, and Nigeria.

Of the 2,192 full time employees, 925 are scientists. The remainder are in the multiplicity of sub-professional, clerical, fiscal, crafts, protective and custodial jobs required to keep research moving smoothly. Not quite a half of the Bureau employees--1,092--are located at Plant Industry Station. In addition there are 705 collaborators, many of whom are outstanding scientists on the staffs of State Experiment Stations that are cooperating with the Bureau.

Since 1934 Bureau research has been set up largely on commodity lines.

Appropriation for the past fiscal year's operations was \$10,844,000.

Bureau research findings were made available to the public in 71 USDA publications and in 1,242 articles prepared by Bureau scientists during the past year. These papers were published in scientific, agricultural, industrial, and general periodicals.

Bureau findings in the news today

Eighty-four out of 900 organic compounds screened for plant growth regulating activity show potency in inhibiting the growth of plants.

An extract containing hormones obtained from immature bean seeds is extremely potent in modifying growth of plants.

The basic light action that controls flowering in plants sensitive to daylength also controls other kinds of plant responses. The ordinary incandescent filament lamp bulbs are ideally suited for lighting plants at night to control their flowering.

On the light sandy soils of Florida citrus trees do not benefit from heavy applications of superphosphate. Heavy potassium fertilization tends to produce late-maturing poorly colored oranges with a thick rind and little juice. Increased applications of nitrogen increases fruit yields but reduces fruit size and the amount of sugar and vitamin C, and delays maturity.

Virus free stocks of four southern varieties of strawberries have been turned over to cooperative nurseries for joint studies on commercial methods for maintaining the stocks in a clean condition.

Blue mold immunity from an introduced spinach (PI 140467) has been incorporated into both shipping and canning varieties.

Handbook of virus diseases of stone fruits published as an RMA project gives information on 48 virus diseases, 7 virus-like diseases, 10 deficiency diseases, and 3 chemical-excess troubles that might be confused with virus diseases.

The first two commercial onion hybrids (one yellow the other white) for the South will be introduced cooperatively by USDA and the Texas Station this fall.

A new short method of composting manure for mushroom culture requires only two weeks and saves far more carbon and other substances from the original.

Moderate icing and greater use of ventilation give adequate protection to citrus in transit from Florida to eastern seaboard cities.

Best storage temperatures for sweetpotatoes are from 55 to 60 °F.

Nursery trees of important susceptible varieties are being inoculated with mild forms of each severe peach mosaic virus to protect them from the disease in areas where there is no other means of eradicating peach mosaic.

Wild plums have been shown to carry the phony peach virus and thickets near orchards may be the source of the disease.

Recently introduced varieties that appear useful in the Northern Great Plains are Mantet and Oriole apples, Chestnut crabapple, Manet, Redglow, Chilcott, and South Dakota plums, and the Sioux strawberry.

Chemical thinning of some 20,000 acres of apple trees in the Pacific Northwest this year was based on Bureau findings.

Commercial growers, using our research findings, practically eliminated the virus disease "stunt" in chrysanthemums.

Several hundred trees of two selected clones of Tyron and Charlotte, wilt-resistant mimosa selections, have been released.

The fungus which causes oak wilt has been found to also cause a wilt disease of the Chinese chestnut.

New explanation for the fact that increases of potash in fertilizer applications lessen the damage to sugar beets on nematode infested land is found in evidence that the root-knot and meadow nematodes produce a potassium deficiency in the plants they attack.

Cotton yields may be reduced by too early application of defoliants. In general, 30-day old bolls will not be harmed.

Approximately 1,500 introductions of fruit and vegetable material were brought in from 56 foreign countries during the past year. A total of 3,822 introductions of field crops was received. Of slightly more than 1,000 introductions of specialty crop plants introduced, 619 collections are of plant materials which may have value as a source for Cortisone.

A new cotton seed drier does an economical job without injuring either germination or oil properties of the seed.

A bright leaf tobacco barn heating system has been designed to use wood, oil, gas, and anthracite or bituminous coal for supplying thermostatically controlled temperatures.

The design and management of the ventilation system proved the most important factor in influencing the loss of weight in potatoes during storage. Fans installed to circulate air will hold temperatures around 40 °F. in below-ground storages during the winter months.

Cold air ventilation appears to be more beneficial than surface stirring to control the accumulation of moisture in surface layers of stored grain.

A shelled corn and small grain drier, which permits continuous operation of the heater and fan in each of the two chambers, reduced moisture in corn from 26 to 14 percent at a cost of $2\frac{1}{2}$ cents a bushel for fuel and power.

Rowan, a high-yielding, nematode-resistant strain of Korean lespedeza, will be available for forage production in the Southeast in 1952.

Six heavy seed producing strains of Japanese lawngrass (*zoyska japonica*) have been found.

Strains of safflower highly resistant to root rot, which caused extensive losses in 1950, are now under study.

Foundation stock of USDA No. 74, an improved castor bean variety was increased and made available for the 1951 program. Acreage of the crop has been expanded from about 9 thousand acres in 1950 to 80 thousand acres in 1951.

During the past year, basic soil surveys have been underway in 32 States.

Soil survey reports were published in 1950-51 for (1) the Duncan area of Arizona and New Mexico; (2) Union County, Georgia; (3) the Idaho Falls area, Idaho; (4) St. Joseph county, Indiana; (5) Marshall county, Kentucky; (6) Otoe county, Nebraska; (7) Woods county, Oklahoma; and (8) Clallam county, Washington.

Laboratory determinations of the amounts and composition of soluble salts, particle size distribution, pH and related properties of soil types are now an important part of the classification of soils.

A soil map of the Arkansas, Red and White River Basins will be used by the USDA Field Committee in preparing agricultural sections of the comprehensive plan for resource development and conservation in the region.

In Mississippi tests, soil in which kudzu was turned under for 4 successive years produced 5 times as much corn as that cropped to corn continuously. Turning under kudzu doubled the nitrogen and organic matter and increased the pore space in the top 6 inches of soil, increased the nitrogen in the next 6 inches, and made moisture available to corn roots from 2 to 3 feet below the surface.

On nitrogen-deficient soils in Nebraska the addition of 40 pounds of nitrogen increased corn yields 33.7 bushels per acre, a second 40 pounds upped the yield another 23.3 bushels, and a third by an additional 13.6 bushels.

The best combination of irrigation, fertilization, and management practices in tests on mountain meadow land increased yields of native hay from 1.3 tons per acre to 3.3 tons. There are approximately 500,000 acres of similar meadow lands in the Western States, where production could be increased with good management.

Barley has a higher degree of salt tolerance than of the other 70 crops tested at the Salinity Laboratory at Riverside, Calif.

Growing improved pastures in rotation with rice in Texas has brought increased yields of rice as well as increased beef production. Best dates for seeding pastures in rice are from October 15 to December 15.

Nitrogen--up to 40 pounds per acre--applied early in the growing season has increased seed yields of several grasses two to three-fold.

Two synthetic varieties of sweet clover with low coumarin content--from .2 to .5 percent--will soon be ready for release.

Pre-emergence treatments with trichloroacetic acid (TCA) will control green and yellow foxtail, the predominant weedy grasses of the Northern sugar-beet fields.

C.P. 43/47, a new sugarcane which combines erectness of growth and uniformity of stalk length with relatively high productiveness and satisfactory disease resistance, lends itself to mechanical harvesting.

Sorghum breeding material is now available with resistance to each of four major diseases: leaf anthracnose, red rot, zonate leaf spot, and rust.

Six corn hybrids resistant to European corn borer were released for commercial production in 1951.

Dixie 82 and Georgia 281 are high yielding corn hybrids for the South.

An improved variety of wheat resistant to rust race 15B is being rapidly increased in Mexico for distribution in southern Texas, should it prove adaptable.

Annual treatment with soil fumigants (D-D) and (Dowfume) appear necessary to control nematode root rot disease in tobacco. Fumigation also controls southern stem rot and fusarium wilt. Row treatments at about half the rates formerly used give effective control.

Successful crosses have been obtained between tobacco and Nicotiana rustica, N. plumbaginifolia, and N. longiflora, wild species immune to black shank disease.

1950 field tests indicated that the better lines of burley tobacco with resistance to wildfire were comparable to the best standard commercial varieties in yield, quality, and returns per acre.

Field tests are now in progress on tobacco breeding material with a combination of resistance to black shank, Granville wilt, fusarium wilt, mosaic root rot, and wildfire.

CHIEF OF BUREAU	R. M. Salter
ASSISTANT CHIEF	F. P. Cullinan, General Bureau Operations
" "	A. H. Moseman, Program Planning and Coordination
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